

Hopping on the Number Line

Reporting Category Computation and Estimation

Topic Estimating and finding the difference of whole numbers

Materials

- Masking tape or chalk (optional)
- Number line for display
- Student Number Lines (attached)
- Counters
- Number Lines Subtraction Recording Sheet (attached)
- Digit Cards (attached)

Vocabulary

difference, subtract, estimate

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Note: Prepare for this activity by creating a number line on the floor in a manner that is acceptable in your school setting (e.g., painter's tape, yarn). Label the line from 0 to 20. Students should have prior experience with number lines and skip counting before engaging in this activity.

1. Inform students that today they will use a number line to find differences. Display a subtraction problem, such as $13 - 5 = \underline{\quad}$. Then, ask, "How can we find the difference, using the number line?" Ask for a volunteer to demonstrate by "hopping back" 5 from 13 on the number line and then telling his/her stopping position (8). Repeat this activity several times with other volunteers. Each time, have the student verbalize what he/she is doing on the number line (e.g., $15 - 7 = \underline{\quad}$. "I start on 15 and hop back 7 spaces to 8; therefore, $15 - 7 = 8$ ").
2. After the class has seen several examples, display a 0-100 number line. Have the class compare this number line to the one on the floor. Ask how it is different. Ask how the class can use this second number line to find differences.
3. Give the students a subtraction problem, such as $80 - 27 = \underline{\quad}$. Ask them how they think they can solve the subtraction problem on the line. They will most likely suggest starting at 80 and hopping back 27 (counting back by ones) to find the answer at the stopping position. Encourage them to describe other possible strategies, such as hopping back two groups of 10 for 20 and then hopping back 7 more.
4. Before solving $80 - 27 = \underline{\quad}$, ask students whether they can estimate (or make a prediction) about what the difference will be (e.g., 27 is close to 30, and $80 - 30$ is 50. The difference will be close to 50).

5. Using the number line, solve $80 - 27 = \underline{\quad}$ by demonstrating the various methods suggested by the class earlier. Model how to record the hops on the number line as well as how to write the numerical form of the problem. Call on various students to suggest numbers to use to create additional subtraction problems, and solve a few more examples with the class.
6. Group the students in pairs, and give each pair a number line, a Number Line Subtraction Recording Sheet, counters, and digit cards. Direct partners to take turns as one student creates a two-digit subtraction problem, using the digit cards, and the other student uses the number line to find the difference. Encourage students to predict the differences before solving the problems on the number line. Tell students they may use counters on the number line to hop back. Ask the first student to record the number of hops in pictures related to the problem and to write the numerical form of the problem. Then, have the students switch roles.
7. Review and summarize with the class what students did and learned in the activity. Have students share some of the problems they created and tell how they found and recorded the differences.

Assessment

- **Questions**
 - Why is estimating the difference before solving a subtraction problem helpful?
 - Compare using a number line to subtract to using base-10 materials to add. How are they the same? How are they different?
- **Journal/Writing Prompts**
 - Marshall's class is learning to subtract using a number line. Explain how a number line can be used to subtract. Draw pictures to show your explanation.
 - Describe how you can find the difference of 63 and 15 on the number line. Show how this can be recorded in at least two different ways.
- **Other**
 - Monitor students as they are working with their partners. Look for students who are having difficulty working with the number line or completing the number line recording sheet. Collect recording sheets as an assessment.
 - Create signal cards (green, yellow, and red) to check for understanding during the activity. Green means "I get it," yellow means "I'm not sure" or "maybe," and red means "I'm lost. I need more help." Pause at different points in the activity, and ask students to hold up their signal cards.
 - At the conclusion of the activity, have the class form a circle to participate in a wraparound. Have students take turns telling something that they learned and will remember, and why this is an important discovery.

Extensions and Connections (for all students)

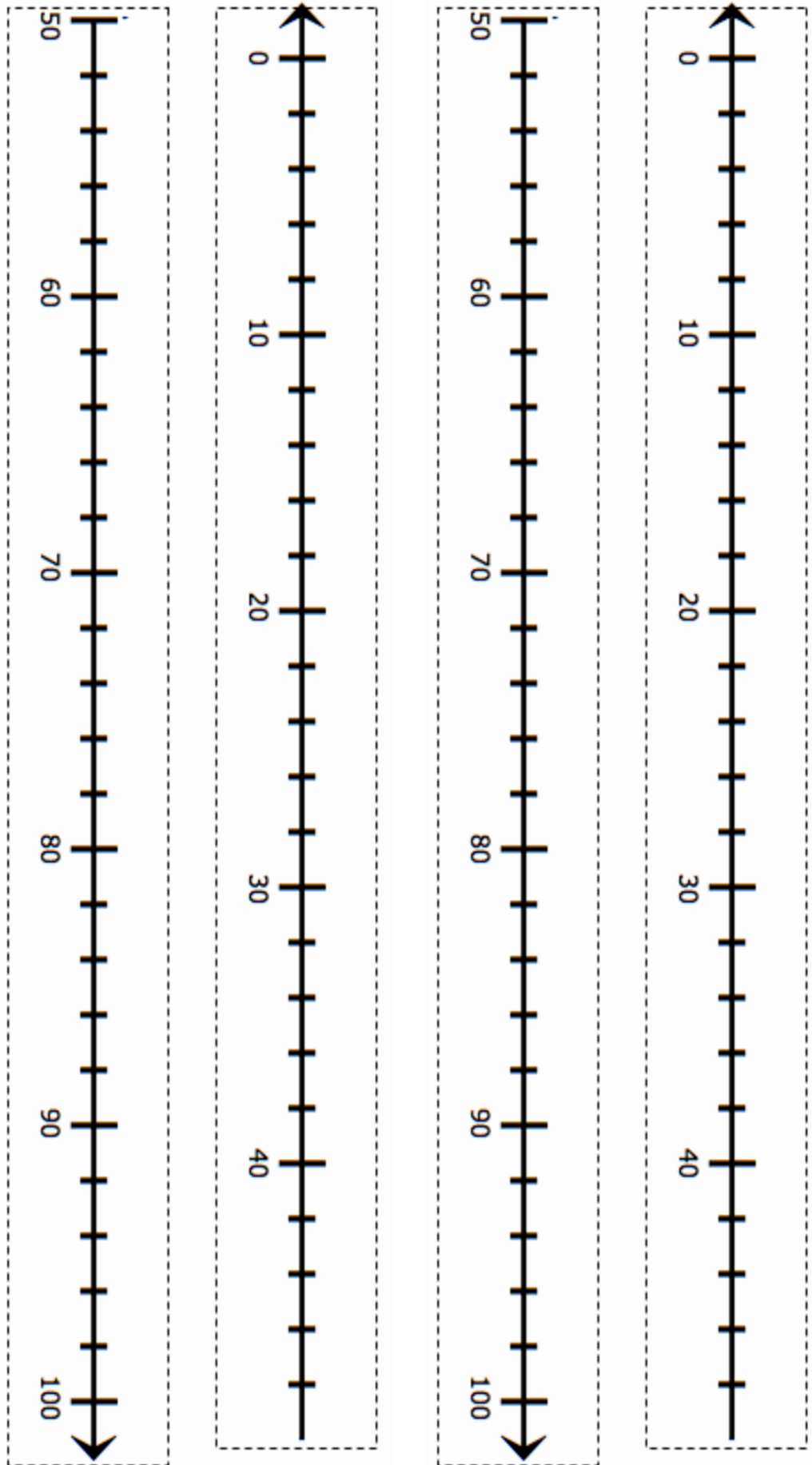
- Have each student write a subtraction word problem and exchange it with a partner. Allow students to use their number lines to solve the problems.
- Discuss how estimation can be used in practical situations involving subtraction.
- Do the activity again, using an open number line.

Strategies for Differentiation

- Allow students to use calculators to check the differences they find.
- Provide enlarged copies of the number line to students who have difficulty using the smaller one.
- Have students use a 10-sided number cube instead of digit cards to create two-digit numbers.
- Have students highlight the tens on the number line to draw attention to them.
- Write in the numbers for each tick mark on the number line.

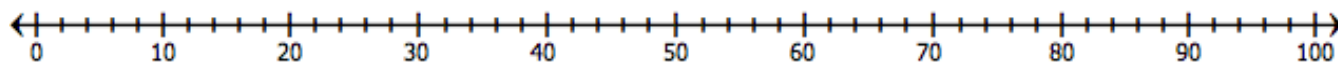
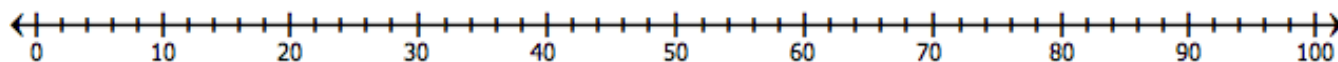
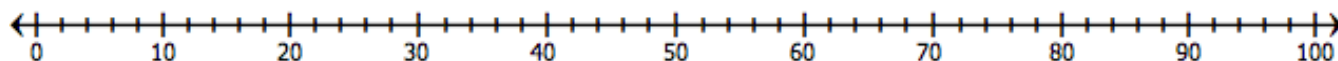
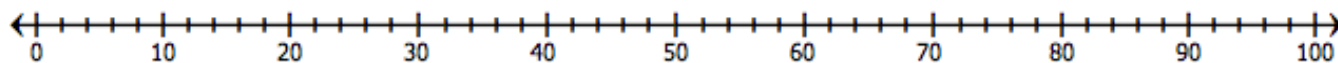
Student Number Lines

Cut strips apart on the
dotted lines, and tape
end to end.



Number Line Subtraction Recording Sheet

Directions: Use a number line below to record the hops related to each subtraction problem.
Record the numerical form of the subtraction problem under the number line.



Digit Cards

Reproduce cards on card stock, and cut them apart on the dotted line.

0

1

2

3

4

5

6

7

8

9

0

1

2

3

4

5

6

7

8

9